

He had had chicken-pox and whooping cough when a child.

Complaint.—For five months before leaving Texas he had been having irregular chills and fever, but never severe enough attacks to keep him from his work. Of quinin he had taken very little, because .3 grm. a day would make his head very uncomfortable. For three days before I saw the patient he had been having daily chills. A sudden change in the color of his urine and a great decrease in the amount passed daily alarmed him; in forty-eight hours he had passed only 420 c. c. For twenty-four hours there had been frequent vomiting; the patient was restless, and tossed about a great deal. The family said that he had been talking incoherently at times.

Physical Examination.—The patient was of stout build, and about 6 feet high. He was very nervous; some twitching of the muscles of the face; tongue heavily coated, and a foul breath; eyelids puffy; no edema of extremities; respiration, 36; pulse, 112; temperature, 103 degrees; thorax, negative; liver and spleen both enlarged.

Blood.—The estivo-autumnal parasites were present in large numbers.

Urine.—Highly colored; acid; 1015; albumin was present, but the amount not large; no quantitative test was made; the blood and epithelial casts were abundant.

Treatment.—Pilocarpin sweats, caffein citrate, quinin intravenously and milk diet quickly restored the patient's health. Sodium bromide was given to offset the head symptoms produced by the quinin. At the end of three weeks the albumin had disappeared from the urine, but now and then a cast could be found.

DISCUSSION.

Dr. W. E. Bates, Davisville.—There is not much in a paper of this character for one to discuss. We have a well-known fact to consider, and that is the presence of nephritis in a percentage of cases. It is not the germ but the antitoxin of the germ that produced the nephritis, as the doctor has already stated. Malaria may be an etiological factor in cases of nephritis to the extent of about 10 per cent. This percentage in a malarial region may be doubled. We find that in about 50 per cent of malarial cases we have albumin in the urine. The author remarks that a nephritis accompanied by high fever should always be examined carefully. I had a case in a man 52 years of age, living in a malarial region, who had an afternoon temperature not exceeding 100. There were albumin and casts in the urine. He had malarial cachexia. I gave him quinin in capsules at first; then hypodermatically, which cured him. The author seems to favor intravenous injection, which I have never used. I do believe in quinin in solution, and if necessary hypodermatically.

Dr. Reinhardt, Berkeley.—I would like to express, in closing, a plea for more careful examination of our patients. We have a remedy which can benefit these patients very positively, and it is well to be sure that we are not overlooking any cases.

PATHOLOGY AND ITS RELATION TO THERAPEUTICS.*

By E. S. PILLSBURY, M. D., Los Angeles.

IT HAS been stated that while the study of pathology has materially advanced our knowledge of disease, and has made a science out of the art of intuitive diagnosis, it has added nothing to the bulk of our therapeutical remedies.

The older practitioner will say of pathology: "Yes, it is a good thing to know, but I have not the time to hunt for bugs in everything. I can tell when albumin or sugar is present in the urine, but what is the use of the rest of it?" The older surgeons say they can locate pus, and drain the cavity. If the pus is "sterile," the patient will get well; if not, and "blood poison" sets in, swabbing out the cavity with carbolic acid or bichloride solution, and then watching the foam bubble up after pouring in the peroxide, is the proper antiseptic treatment. The use of the horse serums is one of those new fads, and forty

years' successful practice without them should demonstrate their non-necessity, if not their uselessness. If it is a tumor to be removed, what difference is it, the variety, so long as it is out?

All modern practitioners are willing to admit that the doctor who knows most of pathology, in its fullest sense, is the most competent diagnostician; many realize that the best surgeon is the one who knows most of pathology, and there are a few who appreciate the relation of pathology to therapeutics.

It is remarkable how few there are who conceive of the term pathology in its full sense. Few realize that it may include chemical and physiological, as well as anatomical, conditions. For obvious reasons, all classroom work in the average medical school is devoted to a rather superficial study of anatomical pathology; four courses of eight months each on the top of the best entrance requirements could be devoted to training in the various branches of pathology, and the time be most profitably occupied. Were all medical men so educated in physiological, chemical and therapeutical pathology, there would be no such thing as prescribing such combinations as "neurilla," "manola," "bioplasm," "chiona," "peruna" or "Hood's Sarsaparilla"; neither would a medical man use antikamina, salferne, phenobromate, acetanilid comp., etc., one after the other, to drive away the same headache.

Pathology has too long been considered a study of death rather than of disease. Huxley has said: "There can be no doubt that the future of pathology and of therapeutics, and therefore of practical medicine, depends upon the extent to which those who occupy themselves with these subjects are trained in the methods and impregnated with the fundamental truths of biology." This can be obtained only through the knowledge of the chemistry and physiology of life.

The growth of the doctrine of toxins forced upon us by modern experimentation in bacteriology may be found in every new text-book of therapeutics. The recent studies in the action of toxins and antitoxins, on the study of immunity, on the nature and causes of diabetic coma, uremic poisoning, autointoxication and other pathological conditions have demonstrated new uses for old therapeutic measures; while the rapid strides which have been made since Koch's discovery of the peculiar action of tuberculin, in our knowledge of resistance and susceptibility to infection, and of the factors which produce immunity during the course of the infectious diseases, have led to the discovery of wonderfully subtle and effective substances which influence the course of disease. These discoveries have shown us the impotency of most of our efforts to obtain artificial therapeutic substances to hurry immunity and the consequent recovery, as well as showing to us the innate power of the organism to develop its own therapeutic substances within the body, which act with unfailing accuracy, to antidote the special poisons then present. This energy of animal life cannot create energy within the sick body, but only tide over the prostration of its mechanism of defense.

Arrhenius and Madsen have shown that the same laws govern the reaction occurring between toxins and antitoxins as occur in ordinary chemical processes; the law of mass action prevailing here as in other reactions.

Another point lost sight of by so many therapists is that the body, in its perfect condition, consists essentially of one and the same kind of elements variously modified. Thus it would appear that a drug capable of affecting the functions of these cellular elements, in any one stage of development or specialization, will likewise affect them in any and all

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stages of modification or specialization, so that certain drugs capable of acting, in proper dose, as function exciters, may, in other dosage, act as function depressors upon all of the great organ systems, the particular system affected depending on the size of the dose. An admirable instance of this has been developed by Crile in the use of strychnin. In minute dosage it has been found to be a function exciter, while in large or continued doses it acts as a depressor, especially on the vasomotor centers.

Pharmacists and chemists are continually producing new compounds for which they are trying to find some use, and consequently a market value. A few good things have been found in this way; but for the reasons given above, scientific therapeutics has received little help from this source. It is not in the discovery of new remedies, but in the determining of the reasons for using any therapeutic agent, that pathology is now chief in the science of medicine and surgery.

It is needless for me to rehearse the discoveries of the various antitoxic serums, nor to claim them as the result of pathological investigation. The subject of immunity has been developed by the pathologist, and the discovery of the immunizing and antitoxic serums has been the result of pathological experimentation. Dead bacteria or their extracts or bacterial culture products are used successfully in the treatment of sarcoma, in cholera and in plague. Could the chemistry of immunity be brought into the realm of substances which can be satisfactorily analyzed, the possibility of constitution formulae would be most alluring. We would have made a long step toward the Fountain of Youth so diligently sought by the romantic Ponce de Leon.

A discovery of as great importance to the surgeon trying to resuscitate a patient dying of shock, as the discovery of the serums was to the physician treating diphtheria, is the discovery of the blood-pressure raising principle of the adrenal gland, and the reasons for its use.

Addison was the first, in 1855, to point out the great importance of the adrenal glands to the animal economy, showing that the disease now bearing his name was due to lesions of these bodies. Attention thus attracted to these glands has developed the fact that they secrete a substance which apparently controls blood pressure through the sustaining influence it exerts on the vasomotor center. Until recently the pathology of shock has not been understood, for the reason that no distinctive lesions are demonstrable at the autopsy. The gross appearances are those usually found in cases of sudden death or death from exhaustion. The heart may be stopped either in systole or diastole. The brain may be either congested or anemic. The lungs are usually in a condition of congestion and edema, which, however, may be due to the anesthetic. The blood is dark and fluid in consistency; immediately before death the blood from the arteries is as dark as that from the veins.

It is needless for me to describe the clinical picture of shock; exhaustion in every feature and function; the anxious expression, pinched face and pale, drawn lips; the cold beaded sweat and glassy eyes are familiar nightmares to all of us, when, after finishing a difficult operation, we look to the condition of the patient with the hope that the work will not be for naught. Crile, in a series of most interesting experiments, has demonstrated that shock is a condition of physiological pathology consisting in a diminution of the blood pressure due, not to exhaustion of the heart muscle, nor of the cardiac centers, nor of the blood vessels, but to an exhaustion of the vasomotor centers. Kinnaman has demonstrated

that the degree of shock may be measured by the temperature of the body of the subject, and that the increased loss of body heat incident to contact with cold during an operation results in a greatly increased degree of shock.

Given the cause, the treatment is simplified. Crile has carefully determined that one is not justified in attempting to reduce or treat shock by the routine administration of the so-called shock tablets, or even physiological salt solution as usually given. He has demonstrated that in shock, alcohol produces a further depression; the same was proven with nitroglycerin and amyl nitrate. Digitalis will sometimes cause a slight rise in blood pressure; but from too large a dose the heart will become irregular, and death may come suddenly from cardiac failure. Strychnin will sometimes give a slight rise in the blood pressure, the effect lasting but a few minutes, when the blood pressure falls to a lower level than before the injection was given. In any degree of shock, after the administration of the therapeutic dose of strychnin, the animals passed into deeper shock. It was further demonstrated that strychnin caused death in shock by exhausting the vasomotor centers.

Crile states that there is no practical distinction to be made between external stimulation of this center, as in injuries and operation, and internal stimulation by strychnin. A statement of this nature cannot be made too emphatic. We, all of us, have seen strychnin given empirically when it must have been injurious, if not fatal. I have seen it given when the pulse was too weak and too rapid to count (the heart beating 190 per minute as counted by the stethoscope), in doses of 1-30 grain every hour. The heart rate was slowed from the paralysis of the vasomotor center, and because of this slowing the physician in charge continued the drug.

Ever since Oliver and Schaffer first announced the remarkable action of suprarenal extract upon the vascular system investigators have been working on the extract, and have found it to be the most powerful vasoconstrictor, as well as the most active cardiac stimulant known; but it remained for Crile to demonstrate the remarkable results to be obtained from its use in shock. He has shown that in the normal animal in every degree of shock and collapse when the medulla was cocaineized; when, in addition, the spinal cord was cocaineized; when the cord was severed, and when, in addition, the medulla was destroyed when the splanchnic nerves were severed; when the heart, the respiration and the vasomotor action were arrested by 2300 volts of an alternating current; when the animal was decapitated, and when it was apparently dead as long as fifteen minutes, epinephrin administered intravenously caused a rise in the blood pressure.

It has been my privilege to use epinephrin solution after nine of the laparotomies I have performed during the last three months with the result of markedly lessening the shock and hastening recovery, giving it hypodermatically five to ten drops in salt solution every hour until evidence of shock had disappeared. The application of heat I consider of utmost importance as a prophylactic measure as well as for treatment of shock; and I may here mention that in the hospitals of Los Angeles I know of not one heated operating table. The patient, clothed only in a nightgown, is brought into the operating room, which, without special instructions from the surgeon, is rarely over 80 degrees Fahrenheit (and I have seen it as low as 65 degrees Fahrenheit), and put on to a cold metal or plate glass table which is covered with a folded sheet. Rarely are any means used or obtainable, with much loss of time, to restore, or even maintain, a normal body heat, and yet many

surgeons wonder at the amount of shock from a comparatively slight operation.

Epinephrin solution has been used in pneumonia with particularly satisfactory results; just before the crisis, when the heart shows signs of exhaustion and the blood pressure is far below normal, the intravenous infusion of epinephrin in physiological salt solution, 1 to 100,000, will raise the blood pressure to normal and hold it there for about twelve hours.

Sajous states that the long line of research into the physiological action of some forty of the more important drugs and venoms has brought out a similarity of the action of poisons, including toxalbumins and venoms, to the phenomena that ensue after the experimental removal of both adrenals or of hemorrhage into these organs. Sajous undoubtedly refers to the depression and chemical shock to the system coincident with the absorption of the poison, so that epinephrin solution would be indicated to alleviate the shock. Again, Klapp has shown that epinephrin inhibits absorption, another reason for its use in poisoning.

Josue has suggested that arterial atheroma might be due to the pathological action of the suprarenals when he observed that high tension which is induced by the injection of epinephrin. This theoretical assumption was corroborated by experimental research, and now he announces that the necropsy of three subjects with arterial atheroma still further confirms it. All three exhibited the anatomic evidences of hyperfunction of the suprarenal capsules. There will undoubtedly be many adverse reports regarding the use of epinephrin solution in disease of the heart because so few take the trouble to measure the blood pressure before prescribing. Epinephrin is not indicated in conditions of excessively high blood pressure.

Another gland which is now being investigated as to its use in the animal economy is the thyroid; it is probable that an extract will be separated from this gland that will rival the adrenal in its importance; for while it has been shown that the adrenal is our most powerful vasomotor and cardiac stimulant, I believe an extract will be obtained from the thyroid that will be a physiological opposite of epinephrin, and be of much use in those conditions of excessively high blood pressure such as are found in arteriosclerosis, some forms of nephritis, diabetes mellitus and other nutritional diseases.

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Duty to the State.—I would earnestly plead, in addressing this audience, and especially the members of the high and honorable profession which has given this gift to the nation, that you never for one moment allow yourselves to forget that the well-being of the Republic ultimately depends on the way in which, as a rule and habitually, the best citizen of the Republic does his duty to the State; and that we have a right not merely to expect, but to demand, from our hardest worked men, from the leaders of the great professions, the full performance of that public service, which consists in a zealous, intelligent and fearless performance of the ordinary duties of public life by the ordinary private citizen.—President Roosevelt in accepting the Rush Monument.

REPORT OF COMMITTEE ON MEDICAL EDUCATION AND LEGISLATION.*

By H. S. ORME, M. D., Los Angeles.

AS TO the topic of Medical Education, it is our opinion that its present status in California is reasonably satisfactory. To the older members of our profession it is especially apparent that the means and results of instruction in the schools, within the last quarter-century, have grown far beyond what was expected. The action of the National and State medical associations in demanding a higher standard of proficiency, deserves the credit for this improvement, which has been gradually effected by extending the period of medical study from a nominal three-year course, of four months (generally an actual two-year duration) to a four-year course, with lectures during the greater part of all the years. Instead of merely a repetition of the annual didactic lectures, a graded course of lectures, combined with extensive laboratory work on practical lines, has been evolved, and clinical instruction has been magnified.

The emphasis laid upon laboratory and clinical instruction cannot be exaggerated, because of the need of equipment for immediate service. The conferring of the degree carried with it inferentially the elevation of the student to an equality with his teachers. While in fact this cannot be, yet in so far as concerns responsibility it may be. For in time of urgent need, whether medical or surgical, the most accessible help is first in demand. Hence it would seem wise, if it could be made practicable, as has been recently suggested by Drs. Osler, Holmes and others, before a license shall be granted by the State Board to require a hospital experience of six to twelve months.

It is within the memory of some here present, when there was no test of education preliminary to medicine, except first signing the college register and finally offering a thesis, which might not have been the work of the candidate. Under the system of forty years ago, it was indeed possible to earn legitimately a medical diploma without knowing A from B, though no instance is known.

Right here is the proper place to observe that the greatest defect in the equipment of medical men to command the respect and serve the wants of the communities where they live, is found rather in their general education than in their professional training. The nominal requirement of a high-school diploma, or its equivalent, would for the present be satisfactory; but there is good reason to believe that this condition is greatly relaxed. The explanation is, that medical examining boards leave the matter to the schools, and the professors are mainly dependent on student tuitions as compensation for their services.

It is both desirable and practicable that our profession should compare favorably with the legal and clerical in general education and culture; but in actual fact we have always ranked somewhat lower. The contrast is less marked now than it was formerly, but it will be our own fault if such distinction continue. The remedy is plain, but the schools should not be expected to apply it. The Board of Medical Examiners should be made responsible for the preliminary education of medical students, as well as for their professional acquirements, and this part of their duties should be discharged before registration in the schools, as is the case in England.

A good deal has been said latterly about reciprocity between the several states in respect to medical qualifications. California has already taken a right step in authorizing our medical board to pursue this course with other boards, and in time it may become custom-

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